

REMARKS

Claims 1-14 are pending in the present application. Claims 1-3 and 13 have been amended, and claims 11 and 14 have been canceled, leaving claims 1-10 and 12-13 for consideration upon entry of the present Amendment. No new matter has been introduced by these amendments as support is found in the specification and claims as originally filed. This amendment is made to overcome the 35 U.S.C. § 112, second paragraph rejections, and also reduces issues for appeal. Accordingly, Applicants respectfully request entry of the amendment. Reconsideration and allowance of the claims is respectfully requested in view of the above amendments and the following remarks.

Claims 1-13 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. With respect to claims 1-13, the Examiner states that Applicant must positively recite "providing a relative movement." Applicants have canceled claim 11 and moved the substance of that limitation into claim 1 to claim "providing at least intermittently a relative movement between the surface to be coated and the dispersion bath during the contacting process." The term "time to time" has been deleted and replaced with the term "intermittently." In addition, support for the term intermittently is found on page 4 in the last paragraph.

In addition in claim 1, the Examiner states that the term "at least one of boron" is not clear. First, the Examiner has dropped off some of the language. The limitation recites "at least one of boron and compounds of boron." The limitation was intended to mean "boron or compounds of boron" or "boron and compounds of boron." However, Applicants have amended the limitation to provide for "and/or" to clarify the intended meaning.

Applicants have also amended claim 3 to recite "in a direction to the surface of the dispersion bath." Claim 13 was amended to include the limitation of claim 14.

With respect to Claim 13, the Examiner states that there are no positive steps to indicate how Applicants produce a coating for the absorption of neutrons. Accordingly, Applicants have amended Claim 13 to overcome this rejection.

In light of the amendments made to Claims 1 and 13, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 112, second paragraph.

Claims 1-13 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 4,238,299 to Wang ("Wang") in view of EPO Publication EP 55,679 to Baburek ("Baburek"). For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d 1016, 1023 (Fed. Cir. 1996).

In particular, the Examiner states that Wang discloses a process for coating a shielding element with a boron copper layer. The Examiner states that Baburek discloses a method for coating a shielding element with a boron-nickel layer. (Page 3, lines 10-12, 34-36). The Examiner states that it would have been obvious to one having ordinary skill in the art to apply the coating method of Wang using the materials disclosed in Baburek as the suggestion/motivation for doing so would have been to agitate the copper boron electrolyte solution thereby achieving an even distribution. (Wang, Column 3, lines 19-40). Applicants respectfully traverse this rejection.

Claims 1 and 13 include the following limitation: "providing at least intermittently a relative movement between the surface to be coated and the dispersion bath during the contacting process." (Emphasis supplied.) Neither Wang nor Baburek teach or suggest that limitation.

Wang discloses a method for producing shielding elements containing boron carbide particles embedded in a copper matrix. The primary use for such shields is in the fabrication of safe containers for the storage, disposal, or transportation of nuclear waste materials and other radioactive substances. (Column 1, lines 8-16). Wang teaches that a tube of stainless steel is removably situated on the bottom of an electrolytic cell so as to be disposed in electrical contact with a cathode contact connected to a current source. (Column 3, lines 6-12). The cell is filled with "conventional copper electrolyte solution 24 containing copper

ions" such that "[t]he entire cell 10 is filled to a level about anode 12...." (Column 3, lines 16-18). Anode 12 is connected to the current source. "[B]oron carbide particles 26 are introduced through funnel 14 *while agitating the electrolyte solution with the stirrers 16.*" (Column 3, lines 20-22, emphasis added). A thin layer of copper is plated on the exposed upper surface of the tube (before or during the introduction of the boron carbide particles) to improve the bonding between the stainless steel and the layer to be built up on the tube surface. (Column 3, lines 24-27). "[T]he stirrers 16 are [then] stopped to allow the [boron carbide] particles to settle onto the surface of the tube 18 while electroplating proceeds..." thereby trapping the boron carbide particles in the copper plate. (Column 3, lines 29-31, emphasis added).

As such, Wang teaches a method of electroplating boron carbide particles onto the tube by *stopping agitation* to allow the boron carbide particles to settle onto the tube. This is different from the claimed invention in that the relative movement occurs during the contacting process.

Baburek discloses a box for underwater storage of irradiated nuclear fuel assemblies. The box includes a coating (I) consisting of boron carbide particles embedded in a nickel binder and a continuous layer (II) of nickel which covers the coating (I). Baburek teaches forming the coating (I) with a plasma torch using boron carbide powder grains coated with nickel. To obtain the boron carbide layer, it is necessary to have a plasma atmosphere surrounding the area where the nickel-bound boron carbide particles will be fixed on the continuous layer (II).

Therefore, unlike Applicants' claimed invention, Wang and Baburek fail to teach a method in which a coating is produced by providing at least intermittently a relative movement between the surface of a shielding element and a dispersion bath. As previously stated, Wang teaches the deposition of boron carbide resulting from the physical "settling out" of the boron carbide particles from the liquid phase of the solution once agitation of the solution is stopped. That is, particles of boron carbide settle out of the liquid phase of the solution after the dispersion bath equilibrates and movement of the solution stops. Therefore, the relative movement between the surface and the dispersion bath claimed by Applicants is patently distinct from the settling of boron carbide particles taught by Wang.

Baburek also teaches away from Applicants' claimed invention inasmuch as the deposition of powder on a surface in a plasma environment precludes relative movement of the coating powder and the surface to be coated. Nor does Baburek teach a dispersion bath.

Moreover, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references to arrive at Applicants' claimed invention. Clearly, Wang teaches away from the claimed invention, in that stirring should be stopped to allow the born carbide particles to settle onto the surface of the tube while electroplating proceeds. Similarly, Baburek teaches away from the claimed invention in that a powder form of boron carbide coated with nickel is applied onto a surface by a plasma torch, and such a powder form necessarily excludes a relative movement between the powder and the surface.

Nor is there suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references to arrive at Applicants' claimed invention. The electroplating method for depositing boron carbide particles onto the surface of a tubing taught in Wang is quite distinct from the plasma torch method for depositing boron carbide onto a casing. That is, these methods have different parameters and working conditions, and are workable on different types of materials. Consequently, since Baburek teaches a method quite distinct from that taught in Wang, one of ordinary skill in the art would not think it probable to utilize the materials disclosed in Baburek in the electroplating method of Wang. Therefore, Applicants submit that there is no suggestion or motivation to combine Wang and Baburek.

Therefore, because neither Wang nor Baburek, either alone or in combination, teaches or suggests all of the claim limitations of Claims 1 and 13, i.e., forming a coating by contacting a surface and a dispersion by providing a relative movement between the surface and a dispersion bath, and because there is no proper motivation to modify or to combine these references, Applicants respectfully submit that a prima facie case of obviousness has not been established for these claims. Applicants, therefore, request reconsideration and withdrawal of the rejection of Claims 1 and 13.

Furthermore, because Claims 2-10 and 12 depend from Claim 1, and because claims that depend from a claim that is non-obvious are themselves non-obvious, Applicants assert

that Claims 2-12 are non-obvious and respectfully request reconsideration and withdrawal of the rejection of Claims 2-12.

In addition, claims 9 and 10 are allowable for additional reasons. Claim 9 includes the following limitation: "wherein boron or boron carbide with more than 20% by volume is embedded in the nickel matrix." Claim 10 is similar, except that it recites more than 40% by volume is embedded in the nickel matrix. The Examiner points to Wang, column 1, lines 20-22 as teaching this limitation. Applicants respectfully traverse.

Wang teaches the following: "One of the known types of containers for nuclear waste materials comprises a plurality of cube-shaped boxes about 9 inches on a side. The 2-5 mm thick walls made of copper-boron carbide composites contain 20-50% boron carbide by weight." Column 1, lines 20-22. As such, Wang is not teaching that boron or boron carbide with more than 20 % volume is embedded in the nickel matrix. Instead, Wang teaches that 20-50% boron carbide is combined with copper. There is nothing in Wang or Baburek that teaches or suggests boron or boron carbide with more than 20% or more than 40% by volume is embedded in the nickel matrix. Moreover, there is nothing in Wang or Baburek that teaches or suggests using boron in its elemental form with more than 20% or 40% volume. Accordingly, for these additional reasons, the rejection should be withdrawn as to claims 9 and 10.

In light of the foregoing amendments and remarks, reconsideration by the Examiner is respectfully requested. It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants.

If there are any additional charges with respect to this Amendment or otherwise,
please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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